Rana University
Faculty of Computer Science
IT Department

Course Title	**OPERATING SYSTEM**
Lecturer Name	**BAITULLAH MALAKHIL**
Credit Hours	**40**
Lecture Days	**32**
Lecture Timing	**75 MINUTES**
Class No.	**302**

Course Description

The Operating System course covers the background concept of how Operating Systems works which includes the working of main memory (RAM) and Central Processing Unit (CPU). The course starts with the fundamentals of operating system and includes the following main chapters:

- ✓ Process Management
- ✓ Memory Management
- ✓ CPU Scheduling
- ✓ Deadlock Management
- ✓ Thread Management

Course Objective

The main objective of the course is to enable the students to have a huge concept of how the Operating System is designed, how is works and which features of an Operating System are responsible for which task. The concept of Processes, inter-process communication, memory, CPU scheduling and file management are few of those concepts which will be covered in this course.

Teaching Method

The Operating System course is full theoretical, the lectures will be taken using the Slides, work document handouts and reference books. Some real life and figure example will be included to make the students understand the main concept. Additionally, two quiz exam, two assignments and a presentation are also considered to be held during the course.

Learning Outcome

By the completion of this course the students will be able to have the concept of:

- ✓ Fundamental of Operating system
- ✓ How the OS is designed

- ✓ How the OS works
- ✓ How to chose an OS
- ✓ How the CPU dispatches processes from Memory
- ✓ What are the main algorithms available for CPU scheduling
- ✓ What is deadlock? How to handle and prevent the deadlock
- ✓ What is thread? What are the benefits of threads over processes

Course Plan

Weeks	Chapters	Teaching Method	Remarks
1	✓ Introduction to software ✓ Types of software ✓ Application software ✓ System software ✓ Operating system ✓ Single-User & Multi-User OSes	Theory	Assisting the students upon the suggested book (As an example, Research Method for Business, Roger Bougie and Sekaran 5th Edition)
2	✓ Components of an OS ✓ Kernel of an OS ✓ Shell of an OS ✓ Functions of an OS ✓ system performance		**Homework**
3	✓ Process ✓ Process states ▪ New ▪ Running ▪ Ready ▪ Suspended ▪ Terminated ✓ Process control Block(PCB) ✓ Possible operation ✓ Inter-process communication ✓ Process synchronization		**Homework**
4	**CPU Scheduling** ✓ Non-preemptive scheduling ✓ Pre-emptive scheduling ✓ Levels of scheduling ✓ Scheduling Criteria ✓ Scheduling algorithm		**Homework**
5	**CPU Scheduling** ✓ QUIZ ✓ First Come First Serve (FCFS) ✓ Shortest Job First (SJF) ✓ Comparison between FCFS & SJF		**Homework**
6	✓ Priority based Algorithm ✓ Problems with Priority based Algorithm		**Homework**

	✓ Solutions for the Priority based Algorithm ✓ Round Robin (RR) algorithm		
7	**Handling deadlocks:** ✓ Multi-level scheduling ✓ Multi-Level Feedback scheduling ✓ Introduction to Deadlock ✓ Conditions of dead lock		**Homework**
8	✓ Deadlock Prevention ✓ Deadlock Avoidance ✓ Deadlock Detection ✓ Deadlock Recovery ✓ Overall review		**Homework**
Mid Term Exam (20%)			
9	**Storage Organization:** ✓ Fixed partition memory management ✓ Dynamic partition ✓ Internal fragmentation		**Homework**
10	✓ External fragmentation ✓ Memory management strategies		**Homework**
11	✓ Fetch ✓ Placement ✓ Replacement		**Homework**
12	✓ Swapping ✓ Non-swapping ✓ Shuffling ✓ Paging basics		**Homework**
13	✓ Basic Segmentation ✓ Basic Paging		**Homework**
14	✓ Demand Segmentation ✓ Demand Paging		
15	✓ Introduction to interrupts ✓ File system		
16	✓ Introduction to threads ✓ Types of threads ✓ Benefits of threads over processes ✓ Multi-threading model ✓ Single threading model		**In accordance with exam schedule**
Reference	C.R. Kothari (2004). Research Method. Quantitative and Statistical Analysis (Methods and Techniques). Second Revised Edition. New Age International Publisher India		

Class Discipline

The students must follow all the rules and regulations of the University and MOHE which include the followings:

- ✓ Students must be present in the class on-time
- ✓ Students must be well dressed
- ✓ Students must have full understanding of previous class
- ✓ The doubts of the students must be cleared if any
- ✓ Homework must be performed on time.

Assessment Method

Many methods are to be used for the assessment and evaluation of the students which :include the followings

- ✓ Evaluation using class feedback orally
- ✓ Evaluation of the homework
- ✓ Evaluation using QUIZ
- ✓ Evaluation using Midterm Examination
- ✓ Evaluation using final examination

Exam Method

Attendance & Class Enrolment: 10% Marks

Quiz: 10% Marks

Midterm Examination: 20% Marks

Final Examination: 60% Marks